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MONTHLY REPORT - SEPTEMBER 1980

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SOUTHWEST FISHERIES CENTER

LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
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TIBURON LABORATORY
PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - SEPTEMBER 1980

STATUS OF PUBLICATIONS

Published

Adams, P. 1980. Life history patterns in marine fishes and their consequences for fisheries management. Fish. Bull., U.S. 78(1): 1-12.

Natural selection operates at the life history level to maximize the number of surviving offspring. Life history characteristics will vary in consistent patterns to meet this constraint. When theoretical patterns in life histories were investigated in terms of r and K selection and compared with actual trends in life history characteristics of fishes, the agreement between observed and predicted trends was significant. The effects of harvesting on stocks with these life history trends were investigated and it was found that K selected type species would be highly sensitive to overfishing and, once depleted, recovery would require a long time.

Mendelssohn, Roy. 1980. Using Markov decision models and related techniques for purposes other than simple optimization: Analyzing the consequences of policy alternatives on the management of salmon runs. Fish. Bull., U.S. 78: 35-50.

The mathematics of Markov decision processes and related techniques are used to analyze a model relevant to salmon management. It is shown that the choice of grid can have a significant effect on the results obtained. Optimal policies that maximize total expected discounted return may be too variable. Smoothing costs are included to trade off long-run total return against the smoothness of the year-to-year fluctuations in the allowed harvest. Simpler, approximate policies that have a

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smoothing effect are also found. Preliminary analysis suggests the results are robust against misspecification of the parameters of the model. Concepts such as maximum sustainable yield would seem to impute a very high smoothing cost and are probably not practical for fish populations with a significant degree of randomness.

Baglin, R. E. Jr., M. I. Farber, W. H. Lenarz and J. M. Mason, Jr. 1980. Shedding rates of plastic and metal dart tags from Atlantic bluefin tuna, Thunnus thynnus. Fish. Bull., U.S. 78(1): 179-185.

Rates of tag shedding were estimated from data collected on double-tagged bluefin tuna during 1971-1977. Overall shedding rates were not significantly different for plastic and metal tags, but plastic tags had lower rates of shedding in most cases. For the combined data, the Type-I shedding rate, that occurs immediately after tagging, was estimated to be 0.040. Type-II, instantaneous shedding rate was estimated to be 0.205 on an annual basis. The data suggested that the assumption of constant shedding throughout the life of the tagged fish may be violated. Shedding was found to vary among years and, because of this and the high rate of shedding, the authors recommended double- tagging when possible.

Approved by Center Director

[No author] Summary report of the Workshop on the Assessment of Selected Tuna and Billfish Stocks in the Pacific and Indian Oceans. For publication in FAO Fisheries Report.

Administrative Report

Yuen, Heeny S. H. A study of live and dead billfishes caught on long-line gear. SWFC Admin. Rep. NO. H-80-12.

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Research Cruises in Hawaiian Waters Continue

Richard N. Uchida, Leader of the Insular Ecosystem Study, reported that the NOAA ship Townsend Cromwell returned to Honolulu on September 6 after completing Part I of cruise TC-80-04 to Kawaihae, Hawaii, and French Frigate Shoals. The cruise was a cooperative effort with the University of Hawaii Sea Grant (UHSG) scientists to survey and quantitatively assess various physical, chemical, and biological parameters pertinent to energy flow, productivity, and mineral cycling. Chief Scientist on the cruise was Research Assistant Bert S. Kikkawa.

Uchida also reported that the Cromwell departed Honolulu on September 13 for Part II of the cruise to survey and assess the demersal and pelagic marine resources in the Northwestern Hawaiian Islands (NWHI). The field party, composed of Chief Scientist Walter M. Matsumoto and Research Assistants Robert B. Moffitt, Thane Shippen, and Bert Kikkawa, and Gary L. Kamer, Statistician, will be (1) conducting gear competition, ghost fishing, and lobster marking experiments at various sites in the NWHI, and (2) collecting fishes of the snapper-grouper complex for marking with tetracycline.

Research Cruise Instructions Completed

Uchida completed the final cruise instructions for Townsend Cromwell cruise 80-05, which is scheduled to begin October 27 and end on December 19. Part I of this cruise involves a cooperative effort with the NOAA officers and crew of the Cromwell, and the University of Hawaii Marine Option Program, to conduct open houses aboard the vessel at Kaunakakai, Molokai; Kahului, Maui; and Nawiliwili, Kauai. The purpose of the open houses is to join with other NOAA agencies in stimulating public awareness of NOAA's missions, the importance of coastal areas to American life, and to disseminate information on NOAA's scientific missions in the field of fisheries.

Part II of the cruise will include work on a survey of monk seals at selected islands in the NWHI, a survey and assessment of lobster, bottom fish, and pelagic and benthopelagic fish resources at selected banks, and a survey of the inshore reef flats at all island locations in the NWHI for brown and red algae on which Gambierdiscus toxicus, a ciguatoxic dinoflagellate, grows as an epiphyte.

Meeting Convened to Plan Cooperative Study of the Mariana Archipelago Natural Resources

In preparation for a forthcoming investigaton of the marine resources of Guam and the Northern Mariana Islands, Laboratory Director Richard S. Shomura convened a planning meeting which brought together the heads and representatives of those agencies which have expressed an interest in a multiagency cooperative study of the natural resources of the Mariana Archipelago. Present at the meeting were heads or representatives of the U.S. Fish and Wildlife Service (USFWS), Government of Guam, Government of the Northern Mariana Islands, Pacific Tuna Development Foundation, University of California Sea Grant, and University of Guam. Participants at the meeting elected Harry Kami, Chief of the Aquatic and Resources Division, Government of Guam, as chairman of the cooperative investigation. In connection with the investigation, Richard Uchida and Research Assistant Paul M. Shiota began preparation of a background document which will provide a historical background and description of the islands within the Archipelago, and a review and summary of much of the published information available on climate, oceanographic climate, plankton surveys, and marine resources of the Guam/Northern Mariana Islands region.

Proposals Prepared for Use of Submersible

In response to a call for proposals by the Hawaiian Undersea Research Laboratory Project (HURLP), which is funded by NOAA's National Undersea Research Program, Fishery Biologist Reginald Gooding worked on proposals to utilize HURLP's submersible Makalii to make visual and photographic surveys of (1) bank, slope, and drop-off areas of Necker Island to assess species composition, distribution, and abundance of bottom fishes and lobsters, relative to depth and bottom topography, and (2) the bank and upper slopes of the Hancock Seamounts to assess distribution and abundance of armorhead, Pentaceros richardsoni, and alfonsin, Beryx splendens.

Preparations Underway for Charter Cruise

James H. Uchiyama, Fishery Biologist, continued preparations for a cruise scheduled to begin on October 1 at Midway and terminate on October 16 in Honolulu aboard the chartered commercial fishing vessel, the Easy Rider. Uchiyama will serve as Chief Scientist and will be assisted by Reginald M. Gooding, Fishery Biologist, John J. Naughton, Fishery Biologist, Western Pacific Program Office, and Research Assistant Steven H. Kramer. The missions of the cruise are to conduct an intensive fishing experiment on an isolated seamount or submerged bank to estimate the initial stock size of various species of fish, and to conduct underwater observations on predation by sharks, large carangids, and monk seals on sublegal and berried females that are captured in traps and, subsequently, released at the surface. Other missions will include night-light fishing and observations while adrift, and collecting live specimens of snappers and kawakawa for return to holding tanks at Kewalo Basin. The live fishes will be marked with tetracycline for studies on age and growth.

Work on the NWHI Ecosystem Model Continues

Dr. Jeffrey J. Polovina, Statistician, continued his studies on the NWHI ecosystem model. The model being developed is a hybrid based on the multi-species growth and mortality functions of the Ursin and Anderson North Sea ecosystem model, using species-specific consumption and predation functions of the Laevastu Bulk Biomass model.

Manuscript Revisions Completed

The manuscript, "Respiration rates and low oxygen tolerance limits in skipjack tuna, Katsuwonus pelamis," by Gooding et al., was accepted for publication in Fishery Bulletin 79(1), following final revision by R. Gooding. Gooding also made minor changes to his NWHI Symposium paper, "Exploratory fishing on the Hancock Seamounts by the Townsend Cromwell, 1976-79."

More Spiny Lobster Specimens Examined for Fecundity Determinations

Research Assistant Victor A. Honda continued his studies on the fecundity of spiny lobster, Panulirus marginatus. He reported that he was able to obtain berried female specimens which were mostly larger than 100 mm in carapace length (CL), from recent commercial research cruises. Whereas his initial sampling in 1978-79 included berried females from 54 to 105 mm CL, the 1980 samples included berried females as small as 53 mm and as large as 123 mm, thus extending the size range of females examined for fecundity. Honda reported that the female measuring 53 mm had an estimated 113,000 eggs, and the one measuring 123 mm had about 603,000 eggs.

* * * * * * * * * *

Research Assistant Paul M. Shiota fabricated gear and made other preparations for Townsend Cromwell cruise 80-04 and 80-05. He also worked with various staff members in writing sections of a statement of justification for modifying the existing laboratory space on the Cromwell for its planned refurbishment.

In addition, Shiota consulted several vessel owners and agencies about the possibility of vessel charters with the National Marine Fisheries Service (NMFS), and prepared for a field trip with Research Assistant Bernard M. Ito to the Midway Islands to collect samples of fish tissues for ciguatera, and to verify the identification of a fish that was implicated in a recent ciguatera outbreak among civilian workers on that island.

FISHERY MANAGEMENT PROGRAM

Hawaiian Skipjack Tuna Landings Continue Below Long-Term Average

The September 1980 Hawaiian landings of skipjack tuna were estimated at 121.2 metric tons (MT), which is 27.1 MT below the September 1979 landings, and 173.2 MT below the 1964-79 long-term average for September. The cumulative landings from January through September were estimated at 1,709.2 MT, which is 829.1 MT below the 1979 landings for the same period, and 1,343.5 MT below the 1964-79 long-term average for the same period.

PELAGIC RESOURCES INVESTIGATION

Induced Spawning Experiments Continue

Thomas K. Kazama, Fishery Biologist, and Sharon D. Hendrix, University of Hawaii graduate student, successfully conducted additional induced spawning experiments on skipjack tuna that were received on September 4. Stress-induced ova maturation, which normally requires approximately 8 hours, was not achieved until 11.5 hours after capture. Fertilization and the subsequent hatch were poor. No larvae survived beyond the yolk stage.

Routine monitoring of ovarian development of skipjack tuna landed at the cannery indicates that the peak spawning period in Hawaiian waters is apparently over.

"Year of the Coast" Exhibit is Readied

Heeny S. H. Yuen, Fishery Biologist, and Tamotsu Nakata, Scientific Illustrator, worked on arranging exhibits for the "Year of the Coast" celebration to be held October 19 at the Aloha Tower in Honolulu. The event will have 46 exhibits, six or more ships open to the public, demonstrations of water activities, music, and food concessions.

* * * * * * * * * *

Tamio Otsu, Chief, Pelagic Resources Investigation, worked on details of the cooperative squid research with the University of Hokkaido, Hakodate, Japan. He also completed a draft translation of a Japanese paper, "Report on the Japanese southern water skipjack tuna fishery," at the request of local industry people. The translation will be processed later for the Laboratory's translation series.

Seabird Studies Continue

Thomas S. Hida, Fishery Biologist, and Michael Seki, Young Adult Conservation Corps, continued to examine seabird spew in a cooperative study with the USFWS.

Hida also spent time with Dr. Daniel L. Stoneburner who provided consultant services relative to the tracking of turtles and seabirds. Dr. Stoneburner provided advice in the preparation of a seabird tracking proposal which will be submitted to the Pacific Tuna Development Foundation.

Hida, Seki, Dr. Stoneburner, and Craig Harrison, USFWS, also spent some time field testing some receivers and transmitters for seabird tracking.

DATA MANAGEMENT AND TECHNICAL SERVICES

Observers Board Japanese Trawlers

Research Assistant Alan R. Everson, who has been serving as an observer on the Japanese trawler, Kitakami Maru, since August 9, transferred to a second trawler, the Aso Maru, which recently arrived in Hawaiian waters. Research Assistant Gordon W. Tribble boarded the Kitakami Maru on September 28 at Midway Island. Both trawlers are fishing on the Hancock Seamounts in the U.S. Fishery Conservation Zone.

Monk Seal Data Being Processed

George W. T. Liao, Operations Research Analyst, reported that data from observations on monk seals were received from Brian and Pattie Johnson, and work has begun to process the data into machine-sensible form. These data represent an entirely new data set and are expected to include data from all of the previous work on monk seals by the Johnsons.

Liao also reported that microfiching equipment was recently delivered and that preparations are underway to begin the filming of source documents from data files and the library collections.

LA JOLLA LABORATORY

Coastal Fisheries Resource Division

ALBACORE FISHERIES PROGRAM

CTD Data from Eastern North Pacific Transition Zone Analyzed

The Albacore Fisheries Group is currently analyzing CTD data taken from 55 stations in the eastern North Pacific transition zone during September 1979. Kenneth Bliss, Oceanographer, served as Scientific Leader aboard the NOS vessel, Surveyor, during the cruise. Bliss and Oceanographer Ron Lynn are now working on a system to remove an intermittent offset in the temperature readings caused by a malfunction in the CTD (conductivity/temperature/depth) profiler. In their first attempt, temperature-depth points which best describe the basic trend of the entire temperature vs. depth relationship were selected from one CTD trace. A fifth-order polynomial equation was derived using these points, producing a smooth curve. The values in this curve were subtracted from the original data, then each residual value was subtracted from the previous residual. The offsets could then be easily identified and plotted on an expanded scale. Seventy-five percent of the errors in the original data were eliminated by comparing the final result at each depth with a corresponding pre-determined offset value derived from the expanded plot. This method, however, proved too costly and time-consuming for application to all the stations. A second scheme is being developed which will allow use of the H-P (Hewlett Packard) minicompuer to plot and digitize expanded station traces, selectively avoiding this offset. Two advantages of this system are: 1) the digitized data will be entered directly into the minicomputer for which processing programs already exist, and 2) the digitizing program will have further application, particularly in handling traces off the ZETA plotter out of the Burrough's computer system at UC, San Diego.

Work Continues on CalCOFI Hydrographic Atlas

Ron Lynn, Oceanographer, has initiated an analysis of the mean seasonal cycles of a variety of oceanographic parameters based on CalCOFI hydrographic data (1950-1978), to be included in an upcoming CalCOFI Atlas. This analysis is a follow-up of ocean parameters being prepared in association with Oceanographers Kenneth Bliss and Lawrence Eber. The atlas, which is nearing completion, presents mean distributions of temperature, salinity, sigma-T, stability, oxygen, percent saturation of oxygen, and geostrophic velocity, on surface charts and vertical sections for 4 months, representative of the four seasons. The analysis of the seasonal cycles of these quantities was begun at this time in order to provide material for two presentations based upon the Atlas: a talk scheduled for the Eastern Pacific Oceanic Conference (October 8), and a poster for the CalCOFI Conference (October 21).

In these presentations, vertical sections of hydrostatic stability showed the seasonal development and dissolution of the shallow summer pycnocline (density gradient). In the offshore region, the summer and permanent (winter) pycnoclines remained separate, forming two distinct vertical maxima in stability. The permanent pycnocline sloped upward toward the shore and, within the Southern California Bight, it coalesced with the summer pycnocline, forming a single maximum in stability.

Subsurface maxima in oxygen and oxygen saturation were found during the summer. Oxygen saturation (which was very near 100% in the winter surface layer) reached 104% over a large area about the top level of the pycnocline. Higher values were found within the Bight, with the highest value being an average of 116% at the surface of station 90.28, just off Dana Point, California.

Vertical sections of geostrophic velocity off Northern Baja California showed that the countercurrent/undercurrent was absent in the mean. The undercurrent was well-developed near the continental slope in July, its core being centered about 200 meters. In October, it was closer to 100 meters and there was a tendency for this poleward flow to broach the sea surface, forming a countercurrent.

LARVAL FISHES, COASTAL EAST PACIFIC

Organ Systems of Pacific Mackerel Studied

Fishery Biologist Charles O'Connell reports that information is now being compiled on the development of several organ systems of the Pacific mackerel to better understand its ecological requirements and capabilities during early growth. A similar study on the northern anchovy was presented, in part, in 1979 at a symposium on the Developmental Biology of Fishes sponsored by the American Society of Zoologists. Some comparisons were made between the anchovy and mackerel (and the groups they represent) in the concluding remarks of that presentation. This information suggested comparisons of the adaptations underlying some of the more notable differences between these species.

As an adult, the mackerel is a particulate, piscivorous feeder: quite close to the obligatory feeding mode for all planktonic larvae. The anchovy, on the other hand, is primarily a filter feeder as an adult: quite different from the obligate larval mode. The difference between the early- and late-feeding modes of the anchovy is probably responsible for its notable metamorphosis, including marked changes in the locomotor apparatus, digestive tract, and jaw-branchial apparatus. In the mackerel, since feeding mode does not change in kind, development can progress towards the definitive adult configuration at an early age.

For example, the trunk musculature of the first-feeding mackerel is relatively thick, with fibers in an arrangement which foreshadows that of the adult. New fibers are added over the whole surface from the beginning,

allowing a rapid increase not only in thickness but also in body depth and, with it, head depth. The jaw mechanism and branchial apparatus can therefore enlarge early.

In addition, the upper limbs of the branchial arches show moderate development by 10 mm SL, whereas they do not start to develop until 20 mm SL in the anchovy. The upper limbs of the arches (and other features) that result in the wide gape capability of the filter-feeding mode would probably be unwieldy if developed during the larval particulate-feeding period. The mouth of the early anchovy is consequently small compared to that of the mackerel, but its more precise feeding strike is probably a compensation for this limitation. The thin and specialized trunk musculature of the anchovy, which is eventually overgrown by a different muscle arrangement, and perhaps the long trunk - short (post-anal) tail body form, may be essential to the precision of its feeding strike.

Much of the more recent information on mackerel development substantiates these views on the differences between the larvae of anchovy and mackerel. It also supports the hypothesis that differences in patterns of larval development often result from accommodation to the kind of adult feeding mode that will succeed the particulate-feeding mode common to all larvae.

Jack Mackerel Larval Study Continues

Gail Theilacker, Fishery Biologist, and Roger Hewitt, NOAA Corps, are participating in a study to evaluate factors which affect the survival of jack mackerel larvae in the sea, with Theilacker concentrating on the incidence of starvation-induced mortality, and Hewitt on egg and larval dispersion. Samples being used were taken last summer during a cruise aboad the R/V D. S. Jordan. A dense concentration of jack mackerel eggs and larvae was located about 200 miles off San Diego in a search area coinciding with a broad tongue of warm water observed on a satellite image of sea surface temperature. Water inshore of this location was cold (about 14° C); offshore, at positive jack mackerel stations, the water temperature was 16° to 17° C.

A rectangular grid of 25 stations, 4 miles apart, was laid out so that the center of the grid appeared to coincide with the highest egg concentration determined by search tows. In all, 41 stations were occupied over a 4-day period; 19 stations were occupied twice. At each station, a bongo-plankton sample (quantitative; one sample preserved in alcohol and one in formalin) and a 1-meter haul (non-quantitative; preserved in Bouin's solution) were taken. The Bouin's samples, to be used for histological and morphological examination, were preserved in less than 10 minutes to prevent larval tissue deterioration. These samples were later sorted for jack mackerel eggs and larvae by Theilacker, Richard Kiy, NOAA Junior Fellow, and Manuel Carillo, Upward Bound Student.

Analysis of the samples showed that a larval-density gradient was apparent in the sample area where high densities of larva (n = 200-250/sample) were located centrally and toward the western boundary; lower densities occurred to the north (30 to 40) and east (0 to 30), with the lowest (0 to 2)

at the southern stations. The latter were occupied at the beginning and the end of the 4-day observation period. Thus, there was negligible surface transport to the south.

Laboratory-determined morphological and histological criteria were used to evaluate the coincidence of starvation among sea-collected larvae. This month, all larvae from one northern station were measured and prepared for histological examination. Jack Metoyer, Biological Technician, assisted Theilacker with the preparation. The sample collected at 0800 on May 4 contained 43 larvae ranging in size from 2.3 mm (yolk-sac larvae) to 5.2 mm (about 2 weeks of age); median size was 4.5 mm (all measurements are adjusted for 13% shrinkage that occurs from 10-minute net capture plus preservation).

To date, 22 larvae (3.6 to 4.8 mm) have been examined from this sample for incidence of starvation. Of these, 20 (91%) had eaten, and 7 of these (32%) had eaten more than the daily requirements, storing the reserves (probably as glycogen) in the liver. Of the remaining two larvae in the sample, one had not eaten for 1 to 2 days.

While the percentage of feeding larvae in this sample was high, six larvae (27%) had, at some time, starved 1 to 2 days. Histological evidence for this previous period of starvation appears as separations between midgut mucosal cells in laboratory animals used in delayed-feeding experiments. In such instances, the onset of growth was slowed when larvae were starved 1 to 2 days before feeding. Growth did not proceed until internal tissues, which had deteriorated during the starvation period, recovered. The energy required for growth may have been diverted to tissue repair during this time, causing these starving larvae to be small for their age. This will be explored in further studies.

Clupeoid Fish Study in Italy Planned

In November, Fishery Biologist John Hunter will visit Italy to work for 30 days with John Blaxter of the U.K. on the biology of clupeoid fishes. Hunter spent part of September working on a literature review of this topic.

SURVEY SYSTEMS DEVELOPMENT AND EVALUATION

Anchovy Spawning Simulation Model Completed

Jeff Napp, an SIO graduate student working with Dr. Paul Smith and Roger Hewitt, has completed a simulation model of anchovy spawning for the purpose of examining questions about sampling strategy and analysis of spawning biomass. Sampling anchovy eggs at sea involves error, both in sampling precision and determining biomass. These can interact in a complex way. The "Napp" program allows the analysis of each error separately.

The errors that are treated include 1) "spatial heterogeneity" or "patchiness" resulting from spawning by schooled adult anchovy; 2) "temporal heterogeneity" caused by the restriction of spawning to nighttime; 3) "mortality"; and 4) temperature-specific development rate and hatching time. The program may be modified to incorporate differences in the depth of spawning and the resultant temperature-controlled development rates.

At the moment, there is no provision for egg dispersal. Examination of the time-course of spawning, by number of eggs and number of samples containing eggs, allows one to infer that individual spawning of a batch of eggs by anchovy is rather brief (on the order of an hour) even though the population of anchovy provides eggs over a 8-hour period each night.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Anchovy Reduction Quota Discussed

Gary Stauffer, Alec MacCall, and Daniel Huppert consulted with State personnel and members of the PFMC Anchovy Advisory Sub-committee in response to a decision by the California Fish and Game Commission to establish a 15,000-ton reduction fishery quota. A meeting with Department of Fish and Game personnel was held at the La Jolla Laboratory on September 10 to discuss 1) how the larva census estimate of the biomass (1.8 million tons) was chosen as a basis for the 1980 anchovy quota, and 2) the probable impact of a 166,000-ton reduction fishery harvest on the anchovy population. Stauffer, MacCall, and Huppert prepared statements for the October 2 meeting of the Fish and Game Commission, which they later plan to circulate to interested parties.

Further Work on Egg Production Biomass Estimate

Susan Picquelle, Statistician, has computed various parameters of the northern anchovy stock, taken from trawl data collected during 1977-1980. These parameters are: 1) sex ratio (number of females over total number of fish in trawl); 2) maturity (fraction of females determined to be mature, based upon the ratio of gonad weight to body weight); and 3) spawning fraction (the classification of female ovaries according to time elapsed since spawning: 0-24 hours = "day-0," 24-48 hours = "day-1," and over 48 hours = "non-spawning"). Two estimates of the spawning fraction (3) were calculated: (a) proportion of day-0 females to all mature females, and (b) proportion of day-1 females to all mature females. These estimates are presented in the following table:

Estimates of the spawning fraction in female northern anchovy.

	Sex ratio	Maturity	Day-0	Day-1
1977	0.4957	0.9593	0.1091	0.1212
1978	0.4348	0.9935	0.1836	0.1574
1979	0.4749	0.8167	0.1581	0.0961
1980	0.4091	0.7081	0.1828	0.1111
All years combined	0.4500	0.8142	0.1643	0.1104

To further examine the differences between the two spawning fraction estimates, the data were tabulated into a continguency table according to the following factors: spawning state and year, month, and time of trawl. The data will be further classified according to surface temperature, and phase of the moon. Logit analysis will be applied to this table to determine the relationships between these factors; hopefully, this will explain the variation in the spawning fraction estimates.

Dungeness Crab Vessel Report Due

Dr. Daniel Huppert, Leader of the Commercial and Recreational Fisheries Research for Management Group, reports that Jerry Fletcher, graduate student in agricultural economics from UC Davis, will soon submit a final report on the dungeness crab vessels in northern California. The report will entail the number of vessels involved, the quantity of catch from several categories (crab, salmon, albacore, groundfish), and the physical characteristics for all vessels reported landing significant amounts of dungeness crab. This type of summary can be used to conceptualize and quantify an economic model of multipurpose vessel operations.

New West Coast Fishing Fleet Study Contracted

In a new project, Dr. Huppert has contracted with San Diego State University to extract and summarize data on two separate west coast fishing fleets: the groundfish trawler fleet which extends from Santa Barbara north to Canada, and the southern California wetfish fleet. The resulting summary data, like that for the Fletcher's crab vessels, will be made available to those interested in examining multispecies fisheries operations, economics, and management.

* * * * * * * * * *

Jane McMillan, Industry Economist, has compiled an updated list of annual landings and revenue earned by the wetfish fleet for 1960-1978. These are grouped by port (San Pedro, Pt. Hueneme), and include the following species: anchovy, jack and Pacific mackerel, Pacific bonito, bluefin tuna, Pacific sardine, and squid.

Oceanic Fisheries Resources Division

TUNA AND BILLFISH RESOURCES PROGRAM

Investigation of Length and Age Composition of Yellowfin Tuna Caught in the eastern Atlantic from 1966 to 1975 Completed

Atilio L. Coan, Mathematician, and Earl Weber, Fishery Biologist, have completed a working document on "Length and age composition for yellowfin tuna catches from the eastern Atlantic Ocean, 1966 to 1977" for the 1980 meeting of the Standing Committee on Research and Statistics (SCRS) of the International Commission for the Conservation of Atlantic Tuna (ICCAT). The analysis updates previous investigations of length and age composition of yellowfin tuna catches in the Atlantic Ocean for the period 1966 to 1975 and incorporates additional data for 1976 and 1977. Length composition of the eastern Atlantic yellowfin catch was estimated by year for baitboats, purse seiners, and longliners; corresponding age compositions were estimated by quarter, year, and gear. Results indicate that longliners caught large quantities of fish less than, or equal to, one year of age in 1976.

Document Prepared for the 1980 Meeting of the Standing Committee on Research and Statistics of ICCAT

Sam Herrick, Industry Economist at the La Jolla Laboratory, has prepared a working document on "A baseline economic analysis of surface tuna fishing activity in the eastern tropical Atlantic Ocean." The paper reviews surface tuna fishing activity in the eastern tropical Atlantic Ocean (ETA) over the 1969-1987 period to provide a baseline from which the impact of management alternatives can be projected.

ICCAT catch and nominal effort data reported by 1° squares were used to examine fishery performance of the major baitboat and purse seine fleets operating in the ETA during 1969-1978. Catch size of yellowfin, bigeye, and skipjack tuna by the major purse seine and baitboat fleets, and the corresponding effort required to produce those catches, were partitioned by 21 subareas to show the spatial distribution of catches and effort in the ETA during this time.

Available United States ex-vessel tuna prices and vessel cost data were used to estimate the revenues and expenditures associated with the baitboat and purse seine tuna catch in each ETA subarea. Estimates of fleet earnings

and costs were then used to calculate the economic value of the ETA tuna resources.

Status of Atlantic Tuna Sampling Programs Reported

U.S. Tuna purse seiners:

As of September 30, 1980, four of the six U.S. purse seiners fishing in the Atlantic Ocean had unloaded their tuna catches in Puerto Rico. These catches were sampled for size composition. The number of samples are as follows:

Species	Vessels sampled	# of samples	# of fish sampled
Yellowfin	4	11	505
Skipjack	4	10	50
Bigeye	3	3	71

Foreign transshipments:

Foreign-caught Atlantic tunas that are transshipped to Puerto Rico continue to be sampled for size and species composition by Eugene Holzapfel, Biological Technician, stationed in Mayaguez, Puerto Rico. Samples are from catches of baitboats, purse seiners, and longliners fishing under Korean, Panamanian, Ghanian, Japanese, Spanish, and French flags. As of September 30, 1980, the following samples were taken:

Species	Gear	# of samples	# of fish sampled
Yellowfin	baitboat	25	1465
	purse seine	5	396
Skipjack	baitboat	16	808
	purse seine	5	250
	longline	1	50
Bigeye	baitboat	11	575
	purse seine	2	86
Albacore	longline	5	240#

Tuna Vessels Participate in FAX Advisory Program

During August 1980, 19 tuna seiners contributed synoptic weather data to the NMFS FAX advisory program. A total of 141 weather observations were reported via NMFS-licensed radio station WWD. The table below summarizes program participation for August 1979 and 1980.

	August 1979	August 1980
Number of vessels with equipment	46	45
Number of vessels reporting	21	19
Number of weather observations reported	203	141
Number of XBT observations reported	0	0
Total observations	203	141

Leading all program participants in July were the captains and crews of the Claudia B. and Top Wave. We wish to thank these and all other contributors.

Fishing Information and Tropical Tuna Advisory Program Terminated

Over the past 20 years, the National Marine Fisheries Service (NMFS), formerly the Bureau of Commercial Fisheries, has provided the monthly publication "Fishing Information" and its 15-day supplement to subscribers. Due to recent changes in funding and staffing within the National Oceanic and Atmospheric Administration (NOAA), responsibility for publishing "Fishing Information" has been transferred to other NOAA elements, particularly the National Weather Service (NWS) and the National Environmental Satellite Service.

The September 1980 issue of "Fishing Information" will be the last published by NMFS. Thereafter, "Fishing Information" or its replacement will be published by other NOAA agencies and mailed to subscribers. NMFS scientists are working closely with personnel within the NWS to ensure that a smooth transition of responsibilities takes place.

On October 1, 1980, the Southwest Fisheries Center's Tropical Tuna Advisory Program will also be terminated. However, this event is expected to have little impact on the types and quality of environmental products offered by radio facsimile (FAX) from radio station WWD, as many of the services being terminated by the Southwest Fisheries Center (SWFC) will be assumed by the National Weather Service (NWS). Anticipated changes to current WWD FAX transmissions are as follows:

1. The mixed layer depth (MLD) chart currently broadcast weekly will be terminated.

2. The sea surface temperature (SST) chart also broadcast weekly will be replaced by a similar product prepared by the NWS.

All other FAX transmissions from WWD will continue as at present.

MARINE MAMMAL BIOLOGY AND TECHNOLOGY PROGRAM

SWFC Scientist Appointed to Advisory Committee

William Perrin, Supervisory Fishery Biologist, has been appointed to the Committee of Scientific Advisors of the U.S. Marine Mammal Commission, for a term of 3 years, effective September 1, 1980. The Committee reviews and provides advice on Federal governmental marine mammal research and management programs, proposed governmental actions, and applications for marine mammal permits. The Commission is directly responsible to the Office of the President. The next meeting of the Commission and the Scientific Committee will be in February 1981 in Anchorage, Alaska.

Age-Determination Method Developed for Manatees

A special project to develop a method for determining age of manatees (sea cow) is achieving its hoped-for goals. Jeff Kelly, a student intern from Southampton College working in collaboration with Dr. Albert Myrick, Wildlife Biologist, has succeeded in locating well-developed layering in the ear bones in a small ontogenetic sample of Florida manatees loaned to Dr. Myrick for investigation by USFWS. A long-standing problem in management of manatees has been that the teeth of the animals are rapidly erupted, worn, and pushed out of the mouth. Layering sites in other parts of the skeleton have not proven reliable. A special decalcification, staining, and mounting procedure renders layers in the ear bones distinct and apparently useful in determination of relative age. Layers occur as presumptive yearly and monthly records, although the actual time content is yet to be tested through the use of tagging and marking experiments of animals in the wild.

Work on Age Determination Progresses for Large Samples of Dolphins

Dr. Myrick reports that work is progressing on the analysis of age composition of subsamples of target dolphin stocks from the eastern tropical Pacific, using readings of teeth for age. The first part of the task calls for the preparation and reading of teeth using 1600 randomly-chosen specimens from the overall sample for the northern offshore spotted dolphin. The teeth are being examined using two different preparation techniques to provide maximum resolution of layers in cemental and dentinal tissue. The study of spotted dolphins will be followed by similar work on samples of eastern spinner dolphins, whitebelly spinner dolphins, common dolphins, and striped dolphins. Makoto Kimura, Fishery Biologist, and Pricilla Sloan, Laboratory

Technician, are carrying out the task of preparing the samples. The work on the spotted dolphin sample is scheduled for completion by the end of this year. Analyses to estimate age-specific fecundity and survival rates for use in estimating net reproduction will begin after that time.

The reading of teeth is expected to accelerate in mid-January when a microcomputer/digital image enhancement system becomes fully operational. The system is being installed and should allow an experienced operator to define and count layers in any dolphin tooth-section with precision. Currently, age determination of toothed whales and dolphins is dependent to a considerable degree upon the experience and skill of the reader.The complicated layering patterns often result in disparities among multiple readings of the same tooth. Dr. Myrick expects the new system to eliminate most of the subjectivity in defining and counting tooth layers. The system will be used to convert layering patterns into alphanumeric code groups; to compare interlayer distances, interlayer thicknesses and repeating code-group patterns; to define and count repeating patterns, and to print out a time-calibrated age computed from the count. Design of the applications software for the system has just begun according to Dr. Myrick.

Scientist from Japan Expresses Interest in Cooperative Work on Marine Mammal Tagging and Tracking

Dr. Tadayoshi Ichihara from Tokai University in Japan visited the SWFC from September 1-3 to consult with Jacqueline Jennings, Fishery Biologist, and Raymond Stives, Fisheries Technician, on tagging methods to be used in his research on cetaceans involved in the Iki Island fishery. Dr. Ichihara is also interested in the use of satellite-based tracking, and he and Jennings discussed potential future cooperation in research in this area. In 1984, Japan will launch its own satellite aimed at marine research, including animal tracking.

Animal-Tracking Assistance Supplied to Several Researchers

Fishery Biologist Jackie Jennings and Ray Stives, Biological Technician of the Tagging and Tracking Project, have been assisting J. Johnson of the National Marine Mammal Laboratory in Seattle to develop a tracking system for use by Dr. Roger Payne in his studies of right whales in Patagonia. SWFC tracking equipment will be loaned to Johnson for this purpose. Similarly, the tagging project in the past has provided equipment to assist SWFC contractor Dr. Bernd Wuersig of the University of California at Santa Cruz for use in his study of spinner dolphins off Hawaii, and to Dr. Andrew Dizon of the SWFC Honolulu Laboratory for use in turtle tracking off the Hawaiian Leeward Islands.

Local Segment of Purse-Seiner Charter for Gear Studies Completed

The entire staff of the Marine Mammal Technology Project (MMTP) and scientists from the Porpoise Rescue Foundation (PRF) participated in a

research cruise in local waters aboard the purse seiner Maria C J, to investigate purse seine dynamics related to porpoise mortality reduction. The cruise began on September 12 and ended on September 19. J. Coe, Supervisory Fishery Biologist, directed the experimental operations. The objectives were:

1. Measure certain aspects of net behavior for input into a computer-based simulation model of the purse-seine operation and for comparison with behavior of a scale-model.

2. Test methods aimed at reducing a persistent backdown channel canopy, or "stern sway."

3. Develop methods of measuring and evaluating purse-seine performance.

4. Gather information for a mathematical model that determines the location of the stern-side net-tie-down point without requiring a trial net set.

The first day of the charter (September 12) was spent at dockside measuring and marking the net in preparation for the various tests. In the 6 days that followed, Captain John Machado and his crew made 12 net sets (two per day) in waters about 10 to 12 miles west of San Diego. By design, no marine mammals or fish were captured in these sets, and the vessel returned to San Diego each evening.

Although most of the data collected during this charter have yet to be analyzed and interpreted, the efforts of the team can be summarized in preliminary form.

Mark Lowry and Tod Foster, Biological Technicians, attached several time-depth recorders to the net at predetermined locations on each of the 12 sets to measure net depth and sinking rates, and to facilitate estimates of net volume In all, 64 casts were made, yielding 60 usable time-depth traces. The leadline fished a maximum of 90 m (6.33 m/min) and the top of the 7th net strip in this 14-strip (horizontal) net reached a maximum of 50 m (2.41 m/min). In 11 of the 12 sets, time-depth traces were made directly beneath the backdown apex to measure channel-rise rates, but these traces have not yet been interpreted.

In 11 of the sets, C. Peters and J. Lambert of the PRF controlled the speed of the maneuver by varying propeller-shaft RPM. In the first set, the control air pressure gauge was calibrated with the shaft tachometer at speeds of 80, 90, 100, 110, 120, 130, 140 and 158, backdown in the subsequent pairs of sets was performed at constant speed, increasing 10 RPM in each pair from 80 to 120. Flowmeters with strip chart recorders were attached by Lowry and Foster at the bow of the vessel and the apex of the net to record actual speeds in 9 sets. A cursory interpretation of these readings shows speed ranges at the vessel bow (N = 7) of 1.00 m/s (80 RPM) to 1.40 m/s (110 RPM) and at the backdown apex (N = 10) of 0.14 m/s (80 RPM) to 0.64 m/s (130 RPM).

David Holts, Fishery Methods and Equipment Specialist, and Charles Oliver, Computer Specialist, made measurements of the strain on the net during backdown in 10 sets by attaching up to five dynamometers to purse ring bridles directly below the backdown apex. Over a 10-ring span (~130 m) centered about the backdown apex ring bridle, several hundred measurements were recorded at 2-min intervals, with maximums at 80 RPM of 900 lbs and at 130 RPM of about 2400 lbs. Histograms of these tensions at each backdown speed will be prepared for the final cruise report.

A SCUBA diving team of James Coe and Richard Butler, Fishery Methods and Equipment Specialists, and Thomas Shay and Bill Brinkerhoff, Biological Technicians, surveyed the underwater configuration of the backdown channel in 11 sets. The 16 non-decompression dives were without mishap. Using markers placed in the net at the dock and marks placed during the first two sets, the divers made comparisons of the degree of stern sway canopy development between normal backdown sets (3) and three sets in which the ring bridles were manipulated to try to reduce stern sway. By lifting the apex and two adjacent sternward bridles inboard during backdown, the number of horizontal net strips (100 meshes x 4.25" per mesh) in the stern sway was reduced from 5 to 7 strips to 3 to 4 strips. This reduction in the amount of webbing involved in the stern sway, however, did not substantially reduce the canopy size, because the meshes in the 3 to 4 strip sway were more open in the vertical axis than in the 5 to 7 strip sway. Further refinement of the ring-bridle manipulation technique could not be pursued due to time limitations.

In three sets, divers measured the change in mesh shapes at various potential locations for attachment of scoops or dams to alter the subsurface configuration of the backdown channel (as otter boards hold open a trawl). It was found that the horizontal mesh angle ranged from 169° (mesh width = 0.42") at rings up to 36° (mesh width = 4.04"), or a change in width of a factor of 10. These measurements were made to help determine the feasibility of permanently attaching scoops or dams to the mesh itself, so that they could accommodate changing mesh shape throughout the set and still be in the proper configuration to be functional during backdown. Several small sheets of nylon reinforced polyvinyl were fitted with snap hooks and attached to the net by divers during backdown in two sets. When properly positioned, the scoops had the desired effect on the webbing, but, as they altered the webbing shape, they became less efficient, requiring continual adjustment of attachment points. The notion of altering net performance by increasing drag in key areas at specific times appears to have potential but will require considerably more investigation.

Net-surface area was measured by Lowry and Foster in 12 sets, using a prismatic range finder and a Polaris to measure distance to, and angles between, balloons attached to a corkline at 100-fm intervals. In one set, the net was allowed to collapse for about 45 min after the rings came up, while measurements of net area were made at 3-min intervals. These data have yet to be reduced to area estimates, but they will eventually be coupled with time-depth recordings along the 7th net strip, to estimate net volume.

Stretched-net depth of the net was calculated to be 90.3 fm (165.2 m), while the distance between the backdown apex and the tie-down point was measured at 104.8 fm (191.8 m). The difference between these (14.52 fm) is equal to 16% of the stretched-net depth, which can be calculated by any captain who knows the design of his net. The formula to find the distance from the apex to the stern tie down point on the corkline in fathoms is then:

$$\left[\frac{500 + (X \cdot N_x \cdot M_x) + (Y \cdot N_y \cdot M_y)}{72}\right] \times 1.16 = TD$$

where 500 is the apron depth in inches,
X is the number of webbing strips of N_x meshes deep of M_x stretch mesh size in inches (e.g., 4.25-inch), and
Y is the number of webbing strips of N_y meshes deep of M_y stretch mesh size in inches (e.g., 5-inch selvage).

This formula should locate the correct stern tie-down point for backdown within 1 or 2 fm of optimum. Once this point has been located, the third-bow branchline can be adjusted to line up to balloons at the apron ends during backdown, resulting in the proper backdown channel without having made a trial set.

Pursing rates were estimated by Steve Storch, student intern from Southampton College, New York, during 10 sets. The bow purse line was retrieved at an average of 0.38 m/s and the stern averaged 0.49 m/s.

Raymond Stives, Biological Technician, acted as photographer to record the various methods employed to gather the data described above.

In the time available, the objectives of the local segment of this charter were more than adequately met, although the areas of stern-sway reduction and net-drag manipulation deserve considerably more investigation.

Tod Foster is presently accompanying the Maria C J on the fishery grounds segment of the charter, which is operating under SWFC Marine Mammal Permit No. 151. His objectives are to observe and quantify the porpoise kill related to stern sway, to make time-depth recordings to measure net-surface area, and to record backdown speed and RPM. The vessel is expected to return to San Diego in late November or early December when the charter will be officially concluded.

Student Intern Assists Biologist with Common Dolphin Mortality Study

Steve Storch of Southampton College is working with personnel in the Behavior and Physiology Project for the fall semester. He has been assigned to assist in an analysis of setlog data from sets on the common dolphin, Delphinus delphis. Two years of common-dolphin data have been extracted and preliminary analyses are underway, in an examination of the data for

indications of why common-dolphin mortality rates are so much higher than spotted-dolphin rates on a per-set basis.

Camp Pendleton Beaches Surveyed for Stranded Marine Mammals

On September 16, the staff of the Marine Mammal Salvage Project surveyed the beach areas of Camp Pendleton Marine Corps Base to document and collect specimens of stranded marine mammals. Public access to the base's 20-km expanse of beach is restricted due to military training activities, and carcasses of stranded animals have often accumulated here in the past. When such a survey was last conducted in 1972, SWFC biologists collected seven cetaceans and documented the presence of several more. The survey was conducted afer the SWFC received permission from the Marine Corps.

This month John Henderson, Fishery Biologist, Larry Hansen, Biological Technician, and Jeff Kelly, a student intern from Southampton College, twice traversed the length of beach using a 4-wheel drive pickup truck. During these transits the survey team found only a single specimen, a Pacific white-sided dolphin, Lagenorhyncus obliquidens, which had obviously been on the beach for several months. The team collected the skull from this animal for further examination.

The reasons for the scarcity of specimens relative to the 1972 survey are not known. Some areas of beach have been made public since 1972, effectively shortening the restricted length of beach. Awareness of the importance of stranded marine mammals has also increased, perhaps resulting in more animals having been reported since pre-1972. Finally, recent training maneuvers on the beaches may have buried or destroyed some specimens.

MARINE MAMMAL ASSESSMENT AND MONITORING PROGRAM

International Whaling Commission Sponsors Workshop on Large Cetacean Sighting Methodology

Drs. Rennie Holt and Tim Smith participated in an International Whaling Commission (IWC) Scientific Committee Workshop on large cetacean sighting methodology in Seattle, Washington, September 11-16, 1980. The IWC is interested in the possibiilty of relying on sighting data, especially for populations with reduced or zero quotas, to monitor the condition of the stocks of large cetaceans. The experience of scientists at the SWFC with the use of line transect sighting techniques for porpoise was presented at the workshop.

New Computer Program - EVOLVE

A new computer program named EVOLVE has been completed by Susan Boyer, of Electronic Data Systems, on contract through GSA. This program provides a very general and flexible stratification of data based on values of selected variables, including geographic position. Non-rectangular geographic strata can be defined, and non-orthogonal collapses of strata can be accomplished. Cluster variables can also be defined. Output is primarily the original data file, augmented by variables describing the stratifications selected with descriptive statistics for selected variables for each stratification cell. This computer program has been designed for use as a preprocessor in creating stratified estimates of porpoise mortality.

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Brown Rockfish Transplants Return to Tiburon

Dr. William H. Lenarz, Leader of the Rockfish Analysis Task, reported that tagged brown rockfish (Sebastes auriculatus) released in various parts of San Francisco Bay have returned to the Tiburon Laboratory. During September, two returns were obtained from a May-release in the Fisherman's Wharf area of San Francisco Bay, and 11 from a June-release near the north end of the Golden Gate Bridge. Both sites are about 5 miles from the Tiburon Laboratory. Fish released at the Golden Gate Bridge grew slightly slower than fish released at the laboratory, with the reduced growth being equivalent to about 20 days growth. The tagging effort is part of a study being conducted to determine density dependent effects on growth and the possible replacement of brown rockfish by other species.

To better quantify this homing ability, tagged brown rockfish have been released at Stinson Beach and Bodega Bay, California (12 miles and 55 miles, respectively, from the laboratory).

Termination of Rockfish Sampling Under MARMAP Funding

Fishery Biologist Tina Echeverria, Rockfish Analysis Task, travelled to ports between Morro Bay and Eureka, California, September 23-26, 1980, to terminate temporary samplers who were hired under one-time MARMAP funding to sample rockfish landings, and to thank California Department of Fish and Game biologists for their considerable help with the project. Echeverria also discussed a cooperative sampling effort which will be done on a reduced scale during the coming Fiscal Year.

FISHERIES DEVELOPMENT INVESTIGATION

Sablefish Study Contracted to Local Fishery

A study to learn the percentage yield of various product forms of processed sablefish was let to Cooperrider-Ryan, a new consulting firm based in the Bay Area. The firm will sample the sablefish catch and processing methods in Monterey, California, to obtain economic data to be used in the Groundfish Management Plan.

Cruise to Provide Commercial Rockfish, Euphausiid Samples

The commercial trawlers, Sanibel and Candi-B, were chartered for a 5-day cruise between Half-Moon Bay and Monterey, California, beginning September 30. The chief objectives of the cruise are to provide commercial samples of shortbelly rockfish and euphausiids to potential users, learn the catch rates for commercial operations, and test the selectivity of the laboratory's new fishing gear: a rope wing midwater trawl, an off-bottom "semi-pelagic" trawl, and a large plankton net. An effort to selectively take squid and sanddabs will also be made, if time permits. Twenty thousand pounds of frozen shortbelly rockfish will be supplied to a domestic pet food maker for trial use, and possible 50 tons exported to Japan for extensive trial sales. Royal Seafoods, a Monterey, California processing firm, will pack, freeze, and sell the fish to buyers. They will also pack the euphausiids. Cruise personnel will include Lt. Patrick Rutten of the NOAA Corps, Sus Kato of the Tiburon Laboratory, and Bruce Wyatt of Sea Grant. Rutten and Fishery Aid Susan Pollock readied the fishing and sampling gear for the cruise.

Leopard Shark Age Validation Studies Resumed

Shark longlining resumed in September in an attempt to recapture some of the tagged leopard sharks (Triakis semifasciata) that had been injected wih the fluorophor oxytetracycline (OTC) and released one year ago in San Francisco Bay. The shark age validation project was started in 1979 to determine, by using OTC as an artificial time marker, if variations in calcification in the vertebral centra of Triakis are time related and, thus, useful for ageing this species. Of the 950 Triakis tagged and injected from August to October 1979, 22 recaptures have been reported to date, including one this month. Vertebrae were obtained from 11 (50%) of these recaptures, but on examination only five showed the fluorescent time mark on the centra, indicating that there may be considerable variation in the uptake and deposition of OTC in Triakis. Because standard sectioning techniques involve decalcification and subsequent destruction of the fluorescent time mark, Fishery Biologist Susan Smith of the Tiburon Laboratory is investigating new methods of sectioning the highly calcified centra so that the rings as well as the time mark will be clearly discernible.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Histopathology: A Tool to Measure Stress of Toxicants in Fish

Michael J. Bowers, Biological Technician, is coordinating histopathological research in the Tiburon Laboratory with work at the Department of Pathology, UC Davis, in order to develop ways to measure stress caused by toxicants in fish. This will allow investigators to estimate the extent and type of damage various chemicals cause in fish tissues, which tissues become targets for chemicals, and which physiological functions become

impaired. Specimens of 5-month, 1-year, and 2-year-old striped bass reared at the Tiburon Laboratory have been sacrificed to establish a standard condition for tissues of this species. Their tissues will be compared with those from laboratory animals and animals in the wild. A study is also being conducted to determine if tissue damage in young-of-the-year juvenile striped bass repairs itself after exposure to high, middle, and low level sublethal concentrations of the petrochemical benzene.

SOUTHWEST REGIONAL DATA MANAGEMENT AND ADP OPERATIONS

Financial Reporting System (FRS) Completed for FY 80

The current Financial Reporting System (FRS) data bases were backed off to tape for archiving after having successfully served the needs of the Center's and the Region's monitoring of expenditures during FY 80 (ending September 30). The data base files for FY 81 will be initiated after the entry programs have been modified to incorporate any changes and additions in the reporting requirements for the new year.

FRS data entries and report generations are made through inter-active mode from other laboratory sites while the La Jolla Laboratory operates in both inter-active and batch modes. Oden Burris, a computer programmer maintaining and monitoring the FRS for SWC and SWR, has added a feature to access usage by laboratory site origin. This feature will be implemented for the FY 81 reporting system.

Final Draft of ADP Requirement Study Received

The final draft of the ADP Requirement Study for the SW and SWR by Systems Architects, Inc. (SAI) was received September 10, 1980. Copies were sent to the Directors of the SWC Laboratories, the Division Chiefs, and members of the data management committee for their review and approval.

Stuart Hill, SAI's Project Manager for the ADP Requirement Study, visited La Jolla Laboratory on September 9 and 10, to collect time estimates to move the SWC workload off INFONET, the conversion of programs to process on a mini and/or another teleprocessing system.

Hill interviewed Dorothy Roll, Robert Butler, Oden Burris, Rich Charter, Chuck Oliver, Tim Smith, Bruce Whalen, Al Coan and Robert Nydam. The summary showed estimates of 1050 days for immediate conversion plus 2070 days for dealyed conversion.

SAI also submitted the preliminary draft of the request for procurement (RFP) for the mini-computers. These specifications have been routed to the data committee members in La Jolla, Hawaii, Tiburon, and Monterey, who were requested to comment and rate the listed draft requirements under three general categories: mandatory, desirable and not needed.

NOAA Chief of ADP Planning and Management Visits SWFC

Art Kneer, NOAA, Chief of the ADP Planning and Management, visited the La Jolla Laboratory on September 22-25. He reviewed the data processing and analysis needs of the Center through interviews with the scientists, data managers of the two divisions, and ADP. Kneer and Fred Kellenberger, SWFC

Data Systems Manager, met with Ed Coughran, Director of UCSD's Computer Center, to discuss the University's offer to house and man a mini-computer system for the La Jolla Laboratory.

PACES Use Increases

Robert Butler, who is maintaining and monitoring the Pacific Cooperative Enforcement System (PACES), is refining the query programs in the system. PACES has been operational for approximately 3 months. During this period the number of "help" calls have diminished, an indication the users are acquiring competence in the use of PACES.

IATTC Explains Mini-Computer Use

The PDP 11/34, a mini-computer system, was the topic presented at the computer users meeting on September 16 at the La Jolla Laboratory. Dr. Robin Allen of the Inter-American Tropical Tuna Commission (IATTC) explained why and how IATTC selected the PDP system. Mark Goldsmith of IATTC discussed the implementation and usage of the system. Dorothy Roll reports that the response to this second users group meeting was excellent. The attendees rate these meetings as most informative and interesting. The users meetings will be held on the third Tuesday of each month.

MISCELLANEOUS

HONORS AND AWARDS

Honolulu Laboratory

Dr. Izadore Barrett, Director of the La Jolla Laboratory, presented Librarian Hazel S. Nishimura with a 20-year service pin, and Clerk Typist Virginia L. Ishida with a 15-year service pin.

La Jolla Laboratory

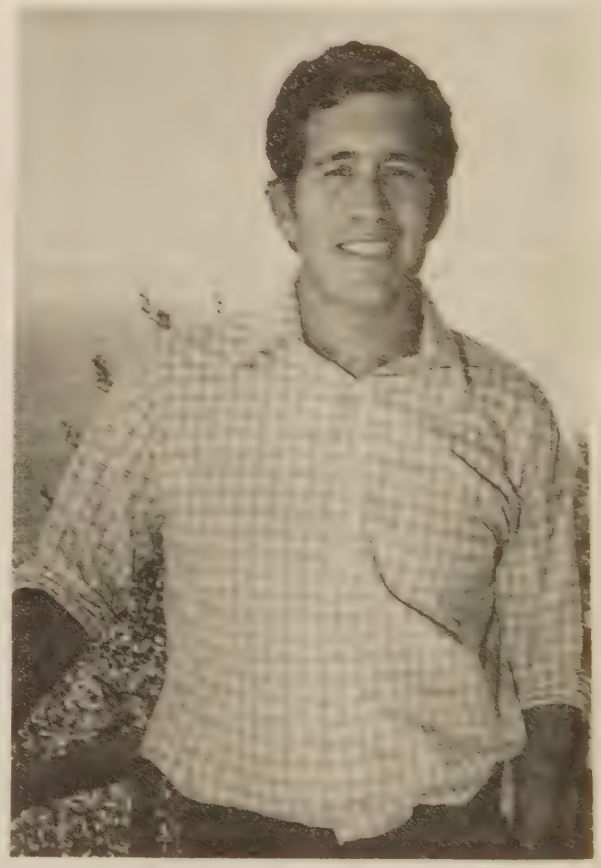
Recipients of honor awards presented by Dr. I. Barrett, Center Director on September 9 during a ceremony at the Southwest Fisheries Center are shown below. From left: Robert Nishimoto, Cash Award; Frances Tonsich, Quality Step Increase; Paul Smith, Cash Award; John Carr, Cash Award; Frank Ralston, Quality Step Increase; Gary Sakagawa, Cash Award; and Dr. Barrett.

Tiburon Laboratory

Director Norman J. Abramson presented a 15-year service pin to Susan Smith, Fishery Biologist.

COLIN BARNETT AWARDED NOAA RESEARCH FELLOWSHIP AT SOUTHWEST FISHERIES CENTER

Dr. Colin Barnett has been awarded the National Research Council/National Oceanic and Atmospheric Administration Post-Doctoral Research Fellowship for 1980-81 at the Southwest Fisheries Center. Barnett, who received his Doctorate in Zoology from the University of California, Berkeley, last year, will spend a year at the La Jolla Laboratory conducting experiments dealing with the chemoreceptive, or taste and smell abilities of adult anchovy and larvae.



During his year at La Jolla, Barnett will be working independently in the laboratory of Dr. John Hunter. Among other experiments, Barnett is constructing a partitioned tank, sections of which will hold different amounts of chemicals. Anchovy can pass through the partitions to reach different chemical gradients, and Barnett will use their movements to determine which chemical concentrations tend to attract the fish. He will also examine how free-swimming schools of anchovies respond to different chemical levels introduced into their environment.

Barnett became interested in animal behavior as an undergraduate at Swarthmore University. Upon his graduation in 1972, he won a Thomas J. Watson Fellowship, a one-year grant that enables recipients to conduct individual research. Barnett's interest in behavioral ecology led him to the Great Barrier Reef in Australia, where he observed the behavior of the dugong. (The dugong, or sea cow, is an endangered marine mammal and a close relative of the manatee.)

A native of Los Angeles, Barnett returned to California and continued his studies of animal behavior in graduate school at UC, Berkeley, where he examined the chemical relationship between cichlid fish and their larvae. After his year at the Center, Barnett will continue his studies in Germany under an Alexander von Humboldt Fellowship. He hopes eventually to teach at the university level and pursue his research in fish behavior.

SEMINARS

Honolulu Laboratory

September 24 - Dr. Daniel L. Stoneburner, University of Georgia, spoke on "Telemetry, turtles, and terns."

La Jolla Laboratory

September 2 - Mr. John T. Bareno, Department of the Navy, Western Field Division, presented a talk on "The law, human rights, and the Hispanics."

3 - Francois Conand of the O.R.S.T.O.M. in Noumea, New Caledonia, spoke on "Cannibalism among skipjack in the South Pacific - A preliminary study."

16 - Dr. Daniel Huppert, Southwest Fisheries Center, presented a lecture on "The value of information: An introduction to some economic concepts with an application to fishery management."

30 - Dr. Nancy Lo, Southwest Fisheries Center, gave a talk "Analyses for evaluating effectiveness of porpoise rescue procedures."

Tiburon Laboratory

September 30 - Dr. Ralph Larson, San Francisco State University, spoke on "How many fish will it kill: The effect of the San Onofre power plant on fishes," as a joint San Francisco State University/Tiburon Laboratory seminar held at the Tiburon Center for Environmental Studies (San Francisco State University).

TRAINING

La Jolla Laboratory

September 24-26 - Dr. Reuben Lasker attended a Satellite User's course at Scripps Institution of Oceanography, La Jolla, CA.

Tiburon Laboratory

September 8-19 - Jeannette A. Whipple - Environmental Quality and Natural Resources - Berkeley, CA.

VISITORS

Honolulu Laboratory

September 2 - Pierre Kleiber, South Pacific Commission, Noumea, New Caledonia.

4 - Herbert H. Shippen, Northwest and Alaska Fisheries Center, Seattle, WA.

8 - Dr. T. Kubota, Tokai University, Shimizu, Japan.

9 - Skip Naftel, Master, Easy Rider Too, Honolulu, HI.

10 - Frank Goto, United Fishing Agency, Honolulu, HI.

- Dr. John Hendrickson, University of Arizona, Tucson, AZ.

18 - Dr. Izadore Barrett, Director, Southwest Fisheries Center, La Jolla, CA.

- Alan W. Ford, Director, Southwest Region, Terminal Island, CA.

19 - Dr. S. Motoda and Dr. N. Tokumatsu, Tokai University, Shimizu, Japan.

La Jolla Laboratory

September 1- 3 - Dr. Tadayoshi Ichihara, Tokai University, Shimizu, Japan.

2 - Dr. Eric Hartwig, Department of Energy, Washington, D.C.

3 - Howard Eckles, former NOAA/NMFS employee, Washington, D.C., and Willa Eckles.

5 - Dan Zider, Florida Sea Grant.

- Guillermo Gomez, University of Washington, Seattle, WA.

5-11 - Dr. Anthony Calabrese, NMFS, Milford Laboratory, Milford, CT.

10 - R. C. Martin, Ocean Pacific Fisheries, San Diego, CA.

22-25 - Art Kneer, NOAA, Chief of ADP Planning and Management, Rockville, MD.

23 - Marty McClure, University of Rhode Island Sea Grant, Narragansett, RI.

- Jack Andrews, NMFS, Southwest Region.

29 - Glynne Williams, Zoological Society of London, England.

30 - Milan Lima, Huatoru Institution, South Africa.

September 29-
October 1 - Richard Shomura, Director, Honolulu Laboratory, HI.

- Gunter Seckel, Pacific Environmental Group, Monterey, CA.

Pacific Environmental Group

September 23-25 - Dr. Valerie Loeb, San Diego Natural History Museum, San Diego, CA.

Tiburon Laboratory

September 5 - Philip A. Meyer, Meyer-Zangri Associates, Davis, CA.

- Gene F. Forbes, U.S. Fish and Wildlife Service, Sacramento, CA.

8 - Anthony Calabrese, National Marine Fisheries Service, Milford, CT.

- Randolph K. Harris, Occupational Safety and Health Administration (OSHA), San Francisco, CA.

- Lt. and Mrs. Plotkin, NOAA Ship Surveyor, Seattle, WA.

9 - Constance J. Ryan, Cooperrider-Ryan, San Francisco, CA.

10 - Raleigh M. Kay, U.S. Department of Labor, OSHA, San Francisco, CA.

- Pepsi Nunes, Institute of Marine Science, University of Alaska, Seward, AK.

- Bob Widergren, Shades of Marin, San Rafael, CA.

29 - Al Millikan, Washington Department of Fisheries, Seattle, WA.

30 - Douglas Ancona, NOAA, Seattle, WA.

- Robert Demory, Oregon Department of Fish and Wildlife, Newport, OR.

- Harvey Hutchings, National Marine Fisheries Service, Seattle, WA.

- Tom Jow, California Department of Fish and Game, Menlo Park, CA.

- Kate King, Northwest Region, NMFS, Seattle, WA.

- Larry Six, Pacific Fishery Management Council, Portland, OR.

MEETINGS AND TRAVEL

September 4 - R. Shomura attended a meeting of the Coordinating Council on Research in the Northwestern Hawaiian Islands, called by Dr. Richard Grigg, Hawaii Institute of Marine Biology (HIMB), University of Hawaii.

11 - R. Shomura attended a meeting of the Scientific and Statistical Committee, Western Pacific Regional Fishery Management Council, in the Honolulu Laboratory (HL) conference room.

12 - A meeting for the "Cooperative Study of the Natural Resources of the Mariana Archipelago" was convened by R. Shomura. HL personnel in attendance included R. Uchida, Dr. Polovina and P. Shiota.

13-18 - R. Shomura traveled to the Samoan Islands (1) to discuss fish aggregating devices and baitfish and vessel building projects with A. L. Philipp, Chief Fisheries Officer, Western Samoa (September 14-15) and (2) to participate in the Western Pacific Regional Fishery Management Council meeting in Pago Pago, American Samoa (September 16-17).

22 - R. Shomura, T. Otsu, and T. Hida met with Dr. D. L. Stoneburner, University of Georgia, Athens, Georgia, to discuss the use of radiotelemetry techniques for a projected tuna-seabird interaction study and for sea turtle tracking.

23 - R. Shomura and M. L. Godfrey attended a Federal Executive Board luncheon at the Halekoa Hotel, Honolulu.

24 - R. Shomura, Dr. Wetherall, Dr. Adams, H. Yuen, and H. Yoshida attended a billfish plan development team meeting in the HL conference room.

25 - R. Shomura, Dr. Wetherall, H. Yoshida, and F. Riggs met to discuss the forthcoming tuna research workshop.

September 29-
October 1 - R. Shomura traveled to La Jolla, CA to participate in the Southwest Fisheries Center Management Meeting.

La Jolla Laboratory

September 4- 5 - Dr. Tim Smith traveled to Washington, D.C. to meet with NOAA/Marine Mammal Office and NOAA Attorneys concerning 1981 tuna-porpoise regulations.

8-11 - Dr. Wesley Parks and Dr. Norman Bartoo visited Montesano, WA, Astoria, Newport, and Portland, OR, for familiarization with albacore fisheries discussions on logbook sample coverage rates with State and PMFC staff.

10 - Dr. Daniel Huppert, Alec MacCall, and Dr. Gary Stauffer of the La Jolla Laboratory met with Herb Kameon, President of the National Coalition for

Marine Conservation, Pacific Division, at the La Jolla Laboratory.

10-17 - Drs. Tim Smith and Rennie Holt traveled to Seattle, WA, to attend a meeting on ship-sighting methodology with the International Whaling Commission.

11 - Dr. Reuben Lasker attended a plankton subcommittee meeting at INP in Ensenada, Mexico.

14-18 - Dr. Michael Laurs attended a NOSS Instrumentation Working Group meeting in Washington, D.C.

15-17 - Dr. Reuben Lasker attended a meeting on Deep Ocean Mining Environmental Studies in Washington, D.C.

15-18 - Charles Oliver traveled to Los Angeles, CA, to attend a workshop on "Managing the DP Professional."

16 - Drs. Daniel Huppert and Gary Stauffer of the Anchovy Management Team met with California Fish and Game personnel J. Radovich, A. MacCall, F. Frey, and M. Odemar, at the La Jolla Laboratory.

16-18 - Wayne Perryman went to New Orleans, LA, to install and test a camera on AT-11 aircraft.

17-20 - Dr. Izadore Barrett, Director of the La Jolla Laboratory, traveled to Hawaii to discuss scientific and administrative matters with Richard Shomura, Director of the Honolulu Laboratory.

21-27 - Dr. Douglas DeMaster attended a meeting of the Hawaiian Monk Seal Recovery Team in Honolulu, HI.

23-26 - Dr. Michael Laurs made a presentation at a SEASAT demonstration workshop in Monterey, CA.

24-25 - An IATTC Advisory meeting was held at the La Jolla Laboratory.

24-26 - Richard Evans traveled to Monterey, CA, to present the final results of the NASA/JPL contract at a meeting/ workshop at the Naval Postgraduate School.

29 - Dr. Gary Sakagawa traveled to Terminal Island, CA, to meet with Gary Smith.

September 30-
October 1 - The Quarterly Center Management Meeting was held at the La Jolla Laboratory, hosted by Izadore Barrett, La

Jolla Laboratory Director. Visiting attendees included Richard Shomura, Director of the Honolulu Laboratory, Norm Abramson, Director of the Tiburon Laboratory, and Gunter Seckel, Director of the Pacific Environmental Group (PEG). La Jolla personnel participating in the meeting included John Carr, Gary Sakagawa, Reuben Lasker, Ben Remington, David Mackett, and Fred Kellenberger.

Pacific Environmental Group

September 29-
October 1 - Gunter Seckel attended the Center Management Meeting at the La Jolla Laboratory, La Jolla, CA.

Tiburon Laboratory

September 2- 4 - Mickey Eldridge traveled to the University of Southern Mississippi, Hattiesburg, to review proposals for research on the synergistic effects of combined pollutants on striped bass.

3 - Norman J. Abramson attended a workshop on Paralytic Shellfish Poisoning (PSP), hosted by the California Department of Health Services, Berkeley, CA.

9-10 - Sydney Smith, NOAA Safety Officer, and Raleigh Kay, Office of Occupational Safety and Health Administration (OSHA), San Francisco, CA, visited the Tiburon Laboratory and met with Norman Abramson, Wally Giguere, and Safety Officers Patrick Rutten and Pete Benville.

9-30 - Dr. Edmund Hobson and James R. Chess studied reef-fish community structure in the Northwestern Hawaiian Islands aboard the R/V Easy Rider.

10 - Dr. William H. Lenarz traveled to Menlo Park, CA, and met with Tom Jow, California Department of Fish and Game, to discuss rockfish sampling.

12 - Edward Ueber visited the Fulton Street Fish Market in New York City, to discuss flatfish prices and current East Coast market conditions.

13-14 - Edward Ueber traveled up the east coast and visited Stonington, CT, and Newport, RI, to talk with local fishermen on marketing restrictions and management.

14-15 - Sus Kato and Susan Pollock traveled to Bodega Bay,

Point Arena, and Fort Bragg, CA, to meet with fishermen, processors, and California Department of Fish and Game personnel.

15 - Norman Abramson and Wally Giguere met at the Tiburon Laboratory with Dave Taylor, Morgan Griffiths, and Al Sartor of San Francisco State University, to discuss a contract for the construction of a new waste disposal system for the Tiburon facility.

15-16 - Edward Ueber co-chaired the joint Groundfish Meeting of the New England Fishery Management Council and Pacific Fishery Management Council (PFMC) at Woods Hole Oceanographic Institute, MA.

16 - Norman Abramson and Sus Kato attended a meeting on salmon pen-rearing at the University of California, Berkeley, CA.

17-18 - Edward Ueber headed the delegation representing the Pacific Fishery Management Council (PFMC) Groundfish Plan which was discussed in Washington, D.C., by NMFS, NOAA, and PFMC personnel. This tentative plan is scheduled to receive final review by the PFMC in October 1980.

19 - Edward Ueber attended a meeting with personnel at the University of Maryland's Department of Agriculture and Resource in fisheries economics.

21-24 - Dr. Jeannette A. Whipple presented a program review of the Tiburon Laboratory's Physiological Ecology Investigation research to the Interagency Committee on Ocean Pollution Research, Development, and Monitoring (COPRDM), at Boulder, CO.

22 - Edward Ueber traveled to the Northwest Region, to discuss fish processing and marketing with personnel of the NMFS Gloucester Laboratory.

23 - Edward Ueber visited the New Bedford, MA, fish auction and the University of Rhode Island at Kingston.

23-26 - Tina Echeverria traveled to ports between Morro Bay and Eureka, CA, to coordinate the termination of temporary samplers who were hired under MARMAP funding to sample rockfish landings.

24 - Edward Ueber visited the Orient Port, NY, fishing fleet to discuss current and future Council management of the groundfish fishery of New England and the Mid-Atlantic States.

25 - Sus Kato traveled to Monterey, CA, to meet with a local fish processor and potential buyers of underutilized fishes.

26-30 - Norman Abramson traveled to the Southwest Fisheries Center, La Jolla, to attend the Quarterly Management Meeting.

PERSONNEL

Honolulu Laboratory

September 2 - Steven H. Kramer, Biological Technician (Fisheries) - Completion of Temporary Appointment.

12 - Steven H. Kramer, Biological Technician (Fisheries) - Temporary Appointment NTE 1 year.

22 - Linda A. Barraclough, Biological Aid (Fisheries) - Conversion to Stay-in-School Program.

26 - Laurie Tsuji, Computer Technician - Completion of Temporary Appointment.

- Andrew J. Aldridge, Biological Technician (Fisheries) - Completion of Temporary Appointment.

- Matthew S. Higashida, Biological Aid (Fisheries) - Completion of Temporary Appointment.

- Dennis L. Kees, Biological Aid (Fisheries) - Completion of Temporary Appointment.

- Cheryl S. Koshiro, Computer Aid - Completion of Temporary Appointment.

- James E. Kennedy, Computer Aid - Completion of Temporary Appointment.

30 - Alan R. Everson, Biological Technician (Fisheries) - Conversion to Temporary Appointment NTE 1 year.

- Natheniel T. Shippen, Biological Technician (Fisheries) - Conversion to Temporary Appointment NTE 1 year.

La Jolla Laboratory

August 29 - Jim Renner retired after more than 23 years with the Fisheries Service. At Jim's request, no retirement party was scheduled prior to his leaving. To provide the recognition his service deserves, all who know Jim have been asked to pen a short note to him on the subject of his retirement. These will be combined with similar notes from long-time subscribers to "Fishing Information" and bound in a book suitable for presentation. Please give your note to Dick Evans (Rm B-209, ext. 339).

30 - Daisy Gaston, Accounting and Budget Technician - name change to Daisy Gaston-Akinwanile.

September 11-25 - While John Carr was on annual leave, Reuben Lasker served as Acting Deputy Center Director.

21 - Virginia Hostler, Secretary, Careet-Conditional Appointment.

- John Davies, Computer Programmer, Career-Conditional Appointment. Mr. Davies' duty station is Terminal Island, CA.

26 - Sam Riordan, Illustrator, Temporary Appointment.

30 - Mark Sweeney retired with more than 31 years of combined Federal Service (12 at the SWFC). To mark the import of this occasion, a luncheon was held for Mark at the La Valencia in La Jolla on Wednesday, September 24, 1980.

In addition to the above actions, 44 personnel actions taking temporary employees off government rolls at the end of the fiscal year were accomplished in September.

Tiburon Laboratory

This month the Underutilized Fishery Resource Development Task lost one-half of its complement of permanent staff members. Roger Green retired after 20 years of Federal Service and is already enjoying hunting and fishing at his mountain retreat in Montana. Industry members will remember Roger for his work on a fast-sinking purse seine, and optimum size of tuna seiners. Fishery Biologist Daniel Ralph accepted a position in his home state of New Jersey at the Sandy Hook Laboratory. Both Roger and Dan were involved with our experimental salmon rearing program, which was completed this year. Fishery

Biologist William Leet will transfer from The Southwest Region to fill one of the vacant positions, starting in early October.

September 20 - Michael F. McGowan, Biological Aid - Termination.

- Daniel E. Ralph, Fishery Biologist - Separation for Reassignment to Northeast Fisheries Center (Sandy Hook Laboratory).

24 - Robert Hamilton, Biological Aid - Termination.

26 - Todd W. Anderson, Robert H. Chamberlain, Patrick J. Guillemot, Marianne McKean, Roslyn Muller, Karen Novak, Susan M. Pollock and Michael M. Singer, Biological Aids - Termination.

- Morden Dunn, Data Clerk - Termination.

29 - Robert B. MacFarlane, Biological Oceanographer - FTP Appointment.

UNITED STATES
DEPARTMENT OF COMMERCE

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